611-TD-564-001

EOSDIS Core System Project

M&O Procedures: Section 21— COTS Hardware Maintenance

Interim Update

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Raytheon Systems Company
Upper Marlboro, Maryland

Preface

This document is an interim update to the Mission Operations Procedures Manual for the ECS Project, document number 611-CD-500-001. This document has not been submitted to NASA for approval, and should be considered unofficial.

This section describes the discussion of commercial-off-the-shelf (COTS) hardware maintenance support which includes COTS hardware procured for the ECS Project and some Government Furnished Property (GFP).

Any questions should be addressed to:

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21. COTS Hardware Maintenance

In this section, discussion of commercial-off-the-shelf (COTS) hardware maintenance support includes COTS hardware procured for the ECS Project and some Government furnished property (GFP).

The following documents are referenced in this section:

- Property Management Plan for the ECS Project 602-CD-001-002
- Functional and Performance Requirements Specifications, 423-41-02
- ECS Performance Assurance Implementation Plan 501-CD-001-004
- Environmental Control Plan for the ECS Project 532-CD-002-001
- Maintenance and Operations Management Plan, 601-CD-001-004
- Version 2.0 Operations Tool Manual 609-CD-003-001
- Version 2.0 COTS Maintenance Plan for the ECS Project, 613-CD-003-001
- Version 2.0 Integrated Support Plan for the ECS Project, 616-CD-002-001
- Replacement Parts List and Spare Parts List 618-CD-002-001

21.1 COTS Hardware Maintenance - General

Overall Responsibility for the management of COTS hardware maintenance rests with the ILS Office. Daily implementation of hardware maintenance policy is the LMC's responsibility. Issues regarding COTS hardware maintenance policy are to be addressed to the ILS manager through the ILS Maintenance Coordinator, using the contact procedures found in the last sentence of this section.

COTS hardware maintenance consists of preventive and corrective maintenance. COTS hardware preventive maintenance is the responsibility of the contracted COTS hardware maintenance providers. COTS hardware corrective maintenance is the responsibility of the contracted COTS hardware maintenance providers, and/or the Local ILS Maintenance Coordinator (LMC) using local DAAC resources. The LMC is the DAAC's local point of contact for directing and coordinating corrective maintenance of ECS COTS hardware. COTS hardware maintenance support is available from the contracted COTS hardware maintenance providers according to the terms specified in each maintenance contract. Some COTS hardware is not covered under a maintenance contract. This equipment is supported with spares located on site at the DAAC, or with centralized EDF spares; or by time and materials contract support. Generally, this spare equipment consists of Monitors, Keyboards, Mice, and a variety of boards. To facilitate easy tracking of maintenance spares at each DAAC, the following method of

identification will be used: in ILM, the ECSNAM for the spares will be the site name with "MAINT" added to the end [EDCMAINT, NSIDCMAINT, etc.]. The LMC ensures that requirements of this section are complied with by all COTS hardware maintenance providers and that accurate and timely information from the DAAC is entered in the Inventory-Logistics-Maintenance (ILM) System**. Instructions on the use of ILM are in chapter 27 of this manual.** The integrated logistics support (ILS) Maintenance Coordinator is a staff position in the ILS office, which is under the Maintenance and Operations (M&O) manager's area of responsibility. The ILS Maintenance Coordinator is available during East Coast normal work hours to provide assistance and guidance to the LMC in obtaining COTS hardware maintenance when normal efforts have been unsatisfactory. The ILS Maintenance Coordinator may be reached via the Internet, telephone, or FAX with the Internet being the preferred method. The Internet address is ilsmaint@eos.hitc.com; the telephone number is 1-800-ECS-DATA, select option #3 then dial 0727 or 4180. The FAX number is 1-301-925-0741.

21.1.1 Corrective Maintenance

Corrective maintenance is the unscheduled repair of equipment, to include fault detection, diagnosis, isolation, and resolution through line replaceable unit (LRU) repair or replacement. The maintenance of hardware items may be performed on site by the LMC or the contracted maintenance provider, or by returning the failed component to the maintenance depot for repair or replacement. COTS hardware corrective maintenance will be documented using procedures in this section and Section 8.1, Problem Management; Section 9, Configuration Management Procedures and the safety requirements of Section 21.1.4

21.1.2 Preventive Maintenance

EMASS and Storage Technology automated tape library robots are currently the only hardware requiring scheduled preventive maintenance. Preventive maintenance is performed by the original equipment manufacturer (OEM) on this equipment. OEMs are expected to coordinate preventive maintenance visits to the DAAC with the LMC. LMCs will record on the maintenance work orders (MWO) any downtime experienced as a result of preventive maintenance.

21.1.3 Configuration Management

Configuration Management (CM) requirements are addressed in Section 9 of this document. The LMC ensures compliance with the CM requirements resulting from a hardware maintenance action.

21.1.4 COTS Hardware Maintenance Safety

Hardware maintenance will be accomplished in a manner that ensures personnel and equipment are protected from harm. Guidance for establishment of safety practices, standards, and procedures is found in Section 6 of the ECS Performance Assurance Implementation Plan (PAIP), 501-CD-001-004. The LMC will ensure that these safety procedures, as well as

applicable local safety requirements, are known and observed by local site support personnel or COTS hardware maintenance providers during COTS hardware maintenance.

COTS hardware safety practices include electrostatic discharge (ESD) protection. The ESD program will be locally developed by the LMC using the ECS Environmental Control Plan, 532-CD-002-001 and applicable DAAC procedures for guidance. When not being worked on or when outside protected areas, electronic parts and assemblies are to be covered by ESD protective covering or packaging. During installation or removal of electronic parts or LRUs, a common ground will be established between the technician, work area, the part, and the equipment it is to be installed in/removed from. It is the responsibility of the LMC to ensure compliance with these safety procedures by the hardware maintenance provider and site personnel.

21.2 COTS Hardware Maintenance - Contract Information

The ECS procurement organization is located at the ECS development facility (EDF) and is responsible for contracting for COTS hardware maintenance. Cost and support considerations may result in COTS HW maintenance being provided by a third party provider. Questions or comments concerning COTS hardware maintenance are to be directed to the ILS Maintenance Coordinator, who can be contacted using contact information contained in Section 21.1, COTS Hardware Maintenance - General.

21.2.1 COTS Hardware Maintenance Contract Database

Information related to COTS hardware maintenance contracts is contained in a database at the ILS Office and is used to manage maintenance contracts. The LMC can obtain extracts of maintenance contract information via the Internet on the ILS web page at http://dmserver.gsfc.nasa.gov/ils/intro.htm. Information fields in the ILS web page are updated periodically by the ILS Maintenance Coordinator.

Generally, COTS hardware maintenance providers require an access, or site, code and/or the serial number of the host equipment to verify that the failed item is covered under a maintenance contract. For example, if maintenance were requested for a terminal/monitor or disk drive, the serial number of the parent workstation or server would need to be provided to the maintenance provider. The serial number may also be the access code for that provider. The information needed by the various COTS HW maintenance providers to verify that maintenance is authorized is specified on the ILS web page. DAAC site-specific site access numbers/site codes/contract numbers, if required, are also listed on the ILS web page. For some COTS HW maintenance providers, names of authorized contact persons are required. The number of authorized contact persons varies with the different maintenance providers. The ILS Maintenance Coordinator, in coordination with the LMC, arranges with the COTS HW maintenance provider for specified personnel to become an authorized contact person. It is the responsibility of the LMC to provide to the ILS Maintenance Coordinator the name changes to the authorized contact list as soon as known. The LMC will identify changes as a permanent or temporary change and, if temporary, the inclusive dates of the change. A temporary change may occur when the authorized contact

person is ill, on vacation, in training, or other short-term change of work availability status has occurred or is expected to occur.

21.3 Hardware Repairs - Standard

Users/operators of ECS hardware should report hardware/system problems to the site's LMC for resolution. Users, operators, and support personnel who encounter a HW problem will report the problem according to Section 8: Problem Management. LMCs will create the MWO in ILM using procedures contained in Chapter 27. The LMC will provide timely feedback to the user/operator on the resolution of the problem The maintenance role of the LMC includes: the following:

(1) receiving notification of HW problems,

(2) opening and closing the MWO,

(3) dispatching the appropriate repair person [system administrator (SA), network administrator (NA), or vendor repair technician].

(4) updating MWO with repair efforts in a timely manner as soon as possible following resolution the problem.

(5) capturing, recording and reporting problems and solutions for future reference - including part numbers, serial numbers, location, and EIN number.

The ILS Maintenance Coordinator: is responsible for:

(1) tracking MWO status,

(2) reviewing MWO and repair actions for appropriateness and completeness

(3) requesting missing MWO information from LMC

(4) updating ILM based on property record actions from the MWO.

(5) identifying support problem areas.

21.3.1 Hardware Problem Reporting

Once a failure occurs, the operator, SA and/or NA will isolate the problem to its source (i.e., Operating System, COTS application software, ECS custom software, science software, network, or COTS hardware) using the actions in Table 21.3-1, DAAC Hardware Problem Reporting Procedures.

Table 21.3-1. DAAC Hardware Problem Reporting Procedures

Step	Occurrence	Action
1	System problem discovered by an SA, NA, or operator,	a. Review error message against the applicable hardware operator manual. b. Verify that power, network, and interface cables are connected and functioning properly. c. Run internal systems and/or network diagnostics. d. Review system logs for evidence of previously related problems or configuration changes that may be contributing to the problem. e. Attempt to reboot the system f. If the problem is fixed, complete a Remedy Trouble Ticket using Section 8 procedures. g. If the problem is not fixed, and is determined to be hardware related, either prepare an MWO or notify the LMC. The LMC will prepare an MWO with status code "O" for open and either notifies the maintenance contractor or replaces the failed component with on-site spare (if available).

21.3.3 Hardware Corrective Maintenance Actions

Hardware problems are forwarded to the LMC. The LMC will attempt to identify the cause of the problem and employ DAAC resources to resolve the problem. If unable to correct the problem using DAAC resources, the LMC arranges for on-site maintenance by the appropriate maintenance provider in accordance with Section 21.3.4, Contract On-Site Hardware Maintenance

Table 21.3-2. Hardware Corrective Maintenance Actions (1 of 2)

Step	Occurrence	Action
1	COTS HW problem not resolved by initial troubleshooting by operator, SA or NA.	a. LMC contacted or notified via MWO or by operator, SA or NA b. LMC opens MWO and adds any cross-reference information for related open Remedy Trouble Ticket (if existing)
2	LMC attempts to identify cause of problem.	a. Reviews the MWO (if operator, SA or NA initiated one). b. Verifies actions and results to date by contacting SA and/or NA. c. Performs initial troubleshooting, including that described in the equipment manuals. d. Records result in the MWO.

Table 21.3-2. Hardware Corrective Maintenance Actions (2 of 2)

Step	Occurrence	Action
3	Problem resolved by LMC or local staff.	a. If problem can be resolved without hardware replacement (e.g. re-seat component, cable, etc): 1) Correct problem, and verify resolution. 2) Record actions taken and enter status code "A" in the MWO. b. If problem can be resolved by replacement of failed LRU with maintenance spare: 1) Replace failed LRU and record following in MWO: a) Part number, serial number, and model/version number of replaced LRU b) Part number, serial number, and model/version number of new LRU c) Down time (elapsed hours/minutes) d) Delay time identified by reason 2) CM requirements are accomplished following procedures in Section 9. 3) Order replacement of failed LRU in accordance with Section 21.4.1. 4) Route failed LRU in accordance with Section 21.4.2. 5) LMC records actions taken to resolve the problem in the MWO 6) LMC forwards completed MWO by recording status code "A"
4	Problem not resolved by LMC or local staff.	a. LMC notifies the maintenance contractor using the information from the ILS web page, providing the telephone number of the vendor and access code needed to obtain support or b. LMC invokes return-to-depot support where appropriate, c. LMC request authorization from ILS Maintenance Coordinator for use of Time and Materials support if that is needed. d. LMC will record all the information in the MWO, to include: make, model, serial number, description of problem, and repair priority of the problem.

21.3.4 Contract On-Site Hardware Maintenance

When on-site hardware maintenance support is necessary, the LMC will notify the applicable maintenance contractor and request assistance. The call for support will be documented in the MWO by the LMC, noting the date and time the contractor was called. It is important that all vendor maintenance activities start and stop times associated with the activities are recorded in the MWO. This is the only means of measuring, and managing the maintenance vendor's contractual performance in support of the ECS system availability goals. Data fields have been specifically created in the MWO to capture this information. Refer to Table 21.3.4-1 for more information about obtaining on-site COTS hardware maintenance support.

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (1 of 3)

Step	Occurrence	Action
1	Local support effort did not resolve the problem.	a. LMC gathers information needed to obtain contract maintenance support and records it in the MWO. 1) Make, model, serial number, and location of failed systems. 2) Description of problem and symptoms. 3) Criticality of the COTS hardware experiencing the problem. b. Using information from the ILS web page the LMC determines: 1) Name of maintenance provider 2) Telephone number of the maintenance provider's technical support center 3) Access code needed to obtain support. 4) Site authorized contact person(s).
2	LMC calls the appropriate support provider's technical support center for maintenance.	a. Provides information from Step 1a above to the maintenance provider to establish a need for on-site support. b. Obtains a case reference number from the COTS hardware maintenance provider c. Informs the providers technician to supply a copy of dispatch trouble ticket with company name, date/time of arrival and departure, PN and SN of all equipment removed and or installed, and a narrative of problem and action taken, or d. Updates the MWO to reflect date/time of the call, all actions, and case reference
3	LMC actions	a. Jointly determine between maintenance contractor and site operations staff an acceptable time to bring the equipment down for maintenance [only applicable when entire device is down. Coordination to schedule down time is only required for a functional, but impaired, device] 1) Obtain tentative time from operations, then obtain concurrence from appropriate maintenance contractor. 2) Obtain information from the maintenance vendor such as availability window of technician and actions needing to be accomplished prior to the technicians arrival. 3) Repeat process until an agreed upon maintenance time is obtained.

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (2 of 3)

Step	Occurrence	Action
4	Maintenance technician arrives at the site.	a. LMC arranges for site access using local established procedures. b. Records arrival time in MWO.LMC request for a copy of dispatch trouble ticket with company name, date/time of arrival and departure, part number & serial number of all equipment removed and or installed and narrative of problem and action taken. c. If required, LMC requests System Administrator site Help Desk, or other appropriate and authorized personnel to shut down the machine at the predetermined time so that corrective action(s) can begin. Note that any user affected by this action must be notified prior to the machine/system shutting down. d. LMC escorts maintenance technician to the hardware e. Ensures maintenance provider's technician places LRU's on an anti-static mat when working on them. f. Ensures the maintenance provider technician places anti-static strap on wrist and connect to a common ground when handling LRU's that can be adversely effected by an electrical charge g. LMC assists the maintenance technician in resolving the problem. This includes: 1) Arranging for a demonstration of the problem (if possible) 2) Arranging for the equipment to be shut down. 3) Obtaining site available technical references, when needed
4a	Maintenance technician corrects the problem by replacement of parts.	a. If a part is replaced, the LMC accomplishes the following: 1) Obtains from the failed part or the maintenance technician: a) serial number, equipment identification number (the EIN number on the silver label), and model/version 2) Obtains from the new part: a) part number, serial number, and manufacturer's model number (if different from part removed, a configuration change request [CCR] is required) 3) Updates the MWO with following information: a) actions taken to correct the problem. b) part number, serial number, and model/version, and EIN (if applicable) of the old and new item c) name of the item replaced d) arrival date and time e) time and date corrective action started f) time and date corrective action completed g) any delay time experienced in completing the corrective action and reason for delay time to repair

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (3 of 3)

Step	Occurrence	Action
4b	Maintenance technician corrects the problem without replacement of parts	a. If no parts were replaced, the LMC updates the MWO with: 1) Actions taken to correct the problem. 2) Time and date technician arrived 3) Time and date repair was started and completed [these times are required to determine RMA data].
4c	LMC requests the SA to make the system functional	a. Sysadmin to restores data, operating system, patches or other SW items to render the system functional. b. Annotates in the MWO that the sysadmin has been notified to restore data. c. Sysadmin notifies LMC upon completion of the requirement
4d	Maintenance technician does not resolve the problem	a. LMC request the Maintenance vendor provide additional technical and or managerial resource to resolve the problem after repair efforts have been underway for 24 hours without resolution b. LMC notifies ILS Maintenance Coordinator that problem repair effort as been delayed, and escalated. c. LMC documents all escalation activity in the MWO until further action is taken.
4e	LMC ensures	a. Receipt of a completed copy of the dispatch trouble ticket from the vendor b. The information from the vendor's ticket is consistent with the information in the MWO
5	LMC	a. Update the MWO with the following information: 1) When the call was made, and to which support provider. 2) Date and time technician made initial contact. 3) Date and time technician arrives. 4) ALDT reason and duration. 5) When repair is complete and support technician leaves. 6) Hours chargeable to hard down time and soft down time.
6	LMC reports actions taken	a. Obtains the authorization of the operation supervisor to make the change. b. Ensures the Configuration Control Board is properly notified of the configuration alterations and requests a formal change using procedures in Section 8.
7	LMC forwards	a. A completed MWO to the ILS Maintenance Coordinator via nightly updates to the SMC by changing status code on MWO to "A". b. A copy of MWO and the vendor’s dispatch trouble ticket.
8	LMC files	a. A copy of vendors dispatch sheets, and related documents in a permanent file and references the MWO or files them with copy of the MWO.
9	LMC verifies	a. Property changes resulting form the MWO are recorded in subsequent updates to ~~it~~ the property inventory report.

21.3.5 Return-to-Depot Support

In some cases the OEM does not provide on-site maintenance. [Refer to the ILS web page for details.] Instead, return-to-depot maintenance support is provided whereby an advance replacement LRU is requested from the vendor by the LMC prior to returning the failed repair. If advance replacement is not provided, then the LMC must return the failed item to the appropriate repair center using procedures contained in Section 21.4-2.

Table 21.3.5-1. Procedures for Obtaining Return to Depot Service

Step	Occurrence	Action
1	LMC contacts	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database
2	LMC requests	a. Advance replacement LRU form the appropriate hardware maintenance provider with shipping instructions prior to returning the failed unit.
3	LMC annotates	a. The expected delivery time, RMA#, carrier information, and the PN, SN, EIN, and suspected problem of the failed item b. Add/move items into MWO as they become available.
4	LMC receives	a. New LRU with RMA authorization.
5	LMC packs	a. The failed LRU using the carton containing the new item following b. The instructions received with the advance replacement part.
6	LMC removes	a. The NASA Property Sticker (silver in color, also called EIN Tag Number) prior to packing the item for shipment. The sticker will be attached to the work order paperwork, and forwarded to the ILS Property Manager for accountability in ILM.
7	LMC applies	a. Address label furnished with the advance replacement to the carton.
8	LMC enters	a. In the MWO, the RMA number from the carton containing the part to be returned
9.	LMC packs	a. The box with failed item and provides a brief description of the problem.
10	LMC annotates	a. In the MWO the RMA#, date shipped to vendor, and expected receipt or return of item; as well as a description of the problem b. .In the MWO the updated inventory changes to the hardware following receipt and reinstallation of the repaired unit.
11	LMC forwards	a. The MWO to the ILS MC by entering status code “A” on the MWO.

Table 21.3.5-2. Procedure for Equipment Advance Replacement

Type 1: Swap [Original LRU not returned following repair]

Step	Occurrence	Action
1	LMC requests	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database), to provide advance replacement if on-site support is not contracted.
2	LMC assures	a. MWO is annotated with failed items PN, SN, EIN, and actions as they become available.
3	LMC obtains	a. RMA number and shipping instructions from the repair vendor.
4	LMC receives	a. New advance replacement with RMA authorization.
5	LMC attaches	a. New EIN sticker on replacement LRU, and creates new item in ILM.
6	LMC installs	a. Advance replacement LRU
7	LMC packs	a. The failed LRU using the carton containing the new item following instructions received with the advance replacement part. b. Remove the NASA Property sticker (also called EIN Tag number, and silver in color) prior to packing the item for shipment.
8	LMC attaches	a. Removed EIN sticker to MWO so LRU can be properly archived.
9	LMC applies	a. Address label furnished with advance replacement to the carton.
10	LMC enters	a. RMA number to the carton containing the part to be returned (if not already entered on the address label).
11	LMC logs	a. Updated information in the MWO (cite RMA#, return address, date shipped to vendor).
12	LMC packs	a. The box(es) of the failed items, and includes a brief description of the problem.
13	LMC updates	a. The MWO status to “A” for Audit with the new information.
14	LMC forwards	a. The MWO, with the updated inventory hardware changes to the SMC.

Table 21.3.5-2. Procedure for Equipment Advance Replacement Type 2: Loaner [Original LRU repaired and returned]

Step	Occurrence	Action
1	LMC requests	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database), to provide advance replacement if on-site support is not contracted.
2	LMC assures	a. MWO is annotated with failed items PN, SN, EIN, and actions as they become available.
3	LMC obtains	a. RMA number and shipping instructions from the repair vendor.
4	LMC receives	a. New advance replacement with RMA authorization.
5	LMC installs	a. Advance replacement / Loaner LRU. Note: This LRU is NOT government property, it is only a loaner. Do NOT place an EIN sticker on this loaner.
6	LMC packs	a. The failed LRU using the carton containing the new item following instructions received with the advance replacement part. Remove the NASA Property sticker (also called EIN Tag number, and silver in color) prior to packing the item for shipment
7	LMC attaches	a. Removed EIN sticker to MWO so LRU can be properly archived. Note: Even though this LRU will be returned when fixed, the EIN will be removed. Following return a new EIN will be attached to the device, and in the note section of ILM annotate both old and new EIN for historical reference.
8	LMC applies	a. Address label furnished with advance replacement to the carton.
9	LMC enters	a. RMA number to the carton containing the part to be returned (if not already entered on the address label).
10	LMC logs	a. Updated information in the MWO (cite RMA#, return address date ship to vendor).
11	LMC packs	a. The boxes of the failed items and includes a brief description of the problem
12	LMC updates	a. The MWO status to “A” for Audit with the new information.
13	LMC forwards	a. The MWO with the updated inventory hardware changes to the SMC.
14	LMC receives	a. The repaired LRU back from the vendor. A new EIN will be attached, and annotated into ILM.
15	LMC reinstalls	a. Original LRU, and removes loaner unit for return to vendor following procedures 8-13 above for shipment of loaner

21.4 Maintenance Spares

The maintenance contractor performing the maintenance normally provides replacement LRUs. However replacement LRUs will typically be obtained from within the metropolitan area where the DAAC is located, and will seldom be stocked on the DAAC site. The ECS ILS Office may procure selected maintenance spares to provide a more rapid return to service for failed critical units and to guarantee their availability. These spares are to be used as a last resort and must be

replaced quickly. The use of a spare in order to keep a system operational does NOT remove responsibility for having the original LRU repaired. The ECS ILS Office will also procure selected spares for hardware items that do not have contracted on-site maintenance. Project spares may be centrally stocked at the EDF, stored on-site in the DAAC property room, or reside as installed spares in equipment.

Maintenance spares are procured and replenished by the ECS ILS Office using the process identified in Paragraphs 4.6.3 and 4.6.4 of Release B COTS Maintenance Plan, document 613-CD-003-001; and Section 23, Property Administration of the 611 document. Spares allocated to the DAACS will be managed at the DAAC by the LMC using guidance from the above referenced documents and appropriate local DAAC policies and procedures.

21.4.1 Use of Maintenance Spares

The LMC will control the use of on-site maintenance spares. Centrally stocked spares can be requested from the ILS Maintenance Coordinator using procedures in Section 21.1. Installation of maintenance spares is performed by the LMC (if qualified) or the COTS hardware maintenance contractor under oversight of the LMC, who ensures procedures in Section 21.3 are followed.

Table 21.4.1-1. Centrally Stocked Spares (1 of 2)

Step	Occurrence	Action
1	LMC opens	a. An MWO to request a spare with a reason and description of the problem.
2	LMC enters	a. An “O” as OPEN in the MWO
3	LMC sends	a. An email to ILS MC
4	LMC receives	a. An email from the ILS MC authorizing the shipment of the spare from the the ILS PA b. The spare from the ILS PA, and ships the failed LRU to the ILS PA or the repair vendor as described by the ILS PA or ILS MC.
5	LMC ensures	a. Individuals installing and deinstalling the spare adhere to the Electrostatic standards by standing on an anti-static mat with anti-static wrist connection with a common ground
6	LMC prepares	a. The shipping label on the carton, clearly displaying the RMA# if required. NOTE the shipping address may differ from the maintenance contractor’s main address
7	LMC updates	a. MWO with repair information, such as start, end, and delay time, PN, and SN of removed/installed items.
8	LMC ensures	a. System is returned to operational status, and notes time. System admin restores data, operating system, patches or other SW items to render the system functional.

Table 21.4.1-1. Centrally Stocked Spares (2 of 2)

Step	Occurrence	Action
9	LMC receives	a. The original, and now repaired, spare from the ILS PA or vendor.
10	LMC returns	a. Loaned spare to ILS PA.
11	LMC updates	a. The MWO, to include spare location, with the EIN and replacement component information such as start, end and delay time, part number and serial number of item removed/installed and forwards the MWO by entering status code “A”.

21.4.2 Return of Failed LRUs

The LMC is responsible for the return of failed LRUs to maintenance contractors providing advanced replacement depot maintenance support (e.g., systems under return-to-depot support). In such agreements the maintenance provider sends to the site a replacement for a failed component under the condition that the site will return the failed component within a reasonable time, usually not greater than 10 days. If the failed component is not returned the contract is charged the full purchase price for the item not returned. Refer to Table 21.3.5-2. for return instructions.

21.5 Non-standard Hardware Support

Non-standard COTS hardware support consists of:

a) maintenance support outside the PPM (Principal Period of Maintenance),

b) support covered under a Time and Materials contract, or

c) escalated support actions by the maintenance support provider.

Table 21.5-1. Procedure for Time and Material Support

Step	Occurrence	Action
1	LMC contacts	a. The ILS MC and requests Time and Material support.
2	ILS MC determines	a. If the problem is critical enough to justify Time and Material Support, and then gives the LMC verbal and written approval to use Time and Material support. Not that approval may contain a dollar limit, time limit, and/or approval reference number
3.	LMC contacts	a. The appropriate vendor for Time and Material support (refer to the ILS web page)
4	LMC monitors	a. Time and Material support costs and time for repair, then faxes or emails the information on the service calls to the ILS MC.
5	ILS MC creates	a. Quarterly reports of Time and Material support including funding used.
6	ILS briefs	a. The CCB on the T&M funds status [done quarterly].

21.5.1 Escalation of COTS Hardware Support Problem

Hardware support providers have escalation policies. These escalation policies direct increased management attention and/or resources to a problem, based on elapsed time from start of the corrective effort. The LMC may also request a support provider escalation any time the corrective effort is not progressing satisfactorily, by calling the maintenance contractor's technical support center and providing the case number generated when the problem was first reported. The LMC may request assistance from the ILS Maintenance Coordinator in obtaining a satisfactory resolution by using procedures in paragraph 21.1.

21.5.2 Low Cost Equipment – Not Repaired

Wyse terminals, keyboards, and mice are low cost items that are not repaired, because the repair costs would exceed the cost of a new item, but are replaced on a one-to-one basis from either the manufacturer or the ILS Office. Items when supported by a maintenance vendor are replaced as part of the contract. The ILS Office through spare replenishment will replace those items not covered under maintenance contract. Maintenance spares, because they are Government property, will not be disposed of without the direction of the Government. LMCs will request disposition instructions for these items from the ILS Office. They will not be discarded without specific direction from the ILS Office. The disposition request will be made by the LMC following procedures in Section 23 and Property Management Plan for the ECS Project, document 194-602-OPI-001.